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Interaction and Viscoelastic Deformation of Polymeric Surfaces Measured with the Atomic Force Microscope

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Methods are described for the measurement and analysis of deformable surfaces with the atomic force microscope (AFM). It is shown how to obtain the zero of separation and how to calibrate the photo-diode for quantitative force measurement [1]. The properties of viscoelastic materials (relaxation times, Youngs moduli) may be extracted by modeling particular sorts of force measurements [2]. Results are shown for a biopolymer agar [3], and for a polyelectrolyte polydimethylsiloxane [4], both of which are viscoelastic, and for polystyrene, which is elastic [5]. The potential for using the AFM as a nanorheometer is discussed.

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